

## CLAIMS

1. Ready-to-use composition for the oxidation dyeing of keratin fibres, and in particular  
5 of human keratin fibres such as the hair, characterized in that it comprises, in a medium which is suitable for dyeing,  
- at least one oxidation dye chosen from heterocyclic oxidation bases and heterocyclic couplers, and  
10 - at least one laccase-type enzyme,  
the said composition being free of heterocyclic coupler chosen from indole, indoline, monocyclic pyridine and phenazine compounds and free of heterocyclic oxidation base chosen from 4,5-diamino-6-hydroxypyrimidine and  
15 3,4-diaminohydroxypyrazole.
2. Composition according to Claim 1, characterized in that the laccase is chosen from laccases of plant origin, of animal origin, of fungal origin or of bacterial origin and from laccases  
20 obtained by biotechnology.
3. Composition according to either of Claims 1 and 2, characterized in that the laccase is of plant origin and chosen from the laccases present in  
25 extracts of Anacardiaceae plants, of Podocarpaceae plants, of Rosmarinus off., of Solanum tuberosum, of Iris sp., of Coffea sp., of Daucus carota, of Vinca minor, of Persea americana, of Catharanthus roseus, of

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5                    4.    Composition according to Claim 1 or 2,  
characterized in that the laccase is of microbial  
origin or obtained by biotechnology.

5. Composition according to Claim 4, characterized in that the laccase is chosen from laccases obtained from *Polyporus versicolor*, from *Rhizoctonia praticola*, from *Rhus vernicifera*, from *Scytalidium*, from *Polyporus pinsitus*, from *Myceliophthora thermophila*, from *Rhizoctonia solani*, from *Pyricularia oryzae*, from *Trametes versicolor*, from *Fomes fomentarius*, from *Chaetomium thermophile*, from *Neurospora crassa*, from *Colorius versicolor*, from *Botrytis cinerea*, from *Rigidoporus lignosus*, from *Phellinus noxius*, from *Pleurotus ostreatus*, from *Aspergillus nidulans*, from *Podospora anserina*, from *Agaricus bisporus*, from *Ganoderma lucidum*, from *Glomerella cingulata*, from *Lactarius piperatus*, from *Russula delica*, from *Heterobasidion annosum*, from *Thelephora terrestris*, from *Cladosporium cladosporioides*, from *Cerrena unicolor*, from *Coriolus hirsutus*, from *Ceriporiopsis subvermispora*, from *Coprinus cinereus*, from *Panaeolus papilionaceus*, from *Panaeolus sphinctrinus*, from *Schizophyllum commune* and from *Dichomitium squalens*, and from variants thereof.

6. Composition according to any one of the preceding claims, characterized in that the amount of laccase(s) is between 0.5 Lacu and 200 Lacu per 100 g of dye composition.

5 7. Composition according to any one of the preceding claims, characterized in that the heterocyclic oxidation base(s) is(are) chosen from pyrimidine derivatives and pyrazole derivatives, and the addition salts thereof with an acid.

10 8. Composition according to Claim 7, characterized in that the pyrimidine derivatives are chosen from 2,4,5,6-tetraaminopyrimidine, 4-hydroxy-2,5,6-triaminopyrimidine and pyrazolopyrimidine derivatives, and the addition salts thereof with an  
15 acid.

9. Composition according to Claim 8, characterized in that the pyrazolopyrimidine derivatives are chosen from pyrazolo[1,5-a]pyrimidine-3,7-diamine, 2-methylpyrazolo[1,5-a]pyrimidine-3,7-diamine, 2,5-dimethylpyrazolo[1,5-a]pyrimidine-3,7-diamine, pyrazolo[1,5-a]pyrimidine-3,5-diamine, 2,7-dimethylpyrazolo[1,5-a]pyrimidine-3,5-diamine, 3-aminopyrazolo[1,5-a]pyrimidin-7-ol, 3-amino-5-methylpyrazolo[1,5-a]pyrimidin-7-ol, 3-amino-  
20 pyrazolo[1,5-a]pyrimidin-5-ol, 2-(3-aminopyrazolo[1,5-a]pyrimidin-7-ylamino) ethanol, 3-amino-7- $\beta$ -hydroxyethylamino-5-methylpyrazolo[1,5-a]pyrimidine, 2-(7-aminopyrazolo[1,5-a]pyrimidin-3-ylamino) ethanol,

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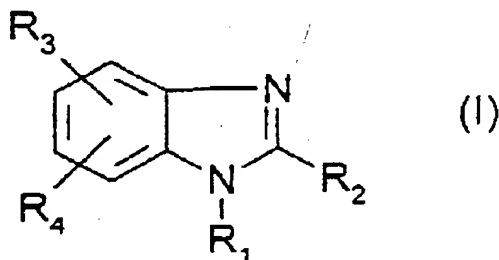
5 2,6-dimethylpyrazolo[1,5-a]pyrimidine-3,7-diamine and

15 4-amino-1,3-dimethyl-5-hydrazinopyrazole, 4,5-diamino-

25            11. Composition according to any one of the  
preceding claims, characterized in that the  
heterocyclic coupler(s) is(are) chosen from  
benzimidazole derivatives, benzomorpholine derivatives,

sesamol derivatives, pyrazoloazole derivatives,  
 pyrroloazole derivatives, imidazoloazole derivatives,  
 pyrazolopyrimidine derivatives, pyrazoline-3,5-dione  
 derivatives, pyrrolo[3,2-d]oxazoline derivatives,  
 5 pyrazolo[3,4-d]thiazole derivatives, thiazoloazole S-  
 oxide derivatives and thiazoloazole S,S-dioxide  
 derivatives, and the addition salts thereof with an  
 acid.

12. Composition according to Claim 11,  
 10 characterized in that the benzimidazole derivatives are  
 chosen from the compounds of formula (I) below, and the  
 addition salts thereof with an acid:



in which:

- 15  $R_1$  represents a hydrogen atom or a  $C_1$ - $C_4$  alkyl radical,  
 $R_2$  represents a hydrogen atom or a  $C_1$ - $C_4$  alkyl or phenyl  
 radical,  
 $R_3$  represents a hydroxyl, amino or methoxy radical,  
 $R_4$  represents a hydrogen atom or a hydroxyl, methoxy or  
 20  $C_1$ - $C_4$  alkyl radical;

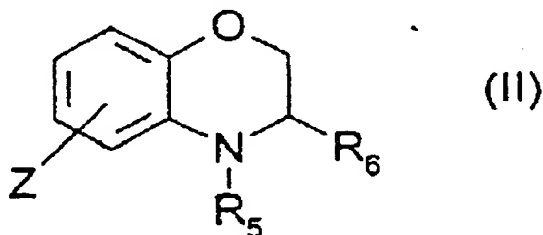
with the proviso that:

- when  $R_3$  denotes an amino radical, then it occupies  
 position 4,

- when R<sub>3</sub> occupies position 4, then R<sub>4</sub> occupies position 7,
- when R<sub>3</sub> occupies position 5, then R<sub>4</sub> occupies position 6.

5                    13. Composition according to Claim 12,  
 characterized in that the benzimidazole derivatives are  
 chosen from 4-hydroxybenzimidazole, 4-amino-  
 benzimidazole, 4-hydroxy-7-methylbenzimidazole,  
 4-hydroxy-2-methylbenzimidazole, 1-butyl-4-hydroxy-  
 10 benzimidazole, 4-amino-2-methylbenzimidazole,  
 5,6-dihydroxybenzimidazole, 5-hydroxy-6-methoxy-  
 benzimidazole, 4,7-dihydroxybenzimidazole,  
 4,7-dihydroxy-1-methylbenzimidazole, 4,7-dimethoxy-  
 benzimidazole, 5,6-dihydroxy-1-methylbenzimidazole,  
 15 5,6-dihydroxy-2-methylbenzimidazole and 5,6-dimethoxy-  
 benzimidazole, and the addition salts thereof with an  
 acid.

                  14. Composition according to Claim 11,  
 characterized in that the benzomorpholine derivatives  
 20 are chosen from the compounds of formula (II) below,  
 and the addition salts thereof with an acid:

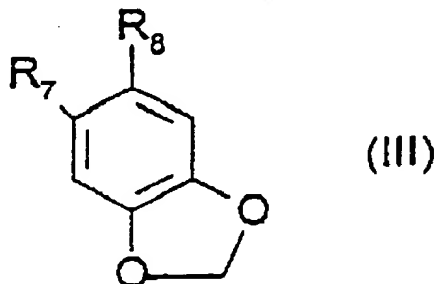


in which:

$R_5$  and  $R_6$ , which may be identical or different, represent a hydrogen atom or a  $C_1$ - $C_4$  alkyl radical,  $Z$  represents a hydroxyl or amino radical.

15. Composition according to Claim 14, characterized in that the benzomorpholine derivatives are chosen from 6-hydroxy-1,4-benzomorpholine, N-methyl-6-hydroxy-1,4-benzomorpholine and 6-amino-1,4-benzomorpholine, and the addition salts thereof with an acid.

10 16. Composition according to Claim 11, characterized in that the sesamol derivatives are chosen from the compounds of formula (III) below, and the addition salts thereof with an acid:



15 in which:

- $R_7$  denotes a hydroxyl, amino,  $(C_1-C_4)$ alkylamino, monohydroxy $(C_1-C_4)$ alkylamino or polyhydroxy $(C_2-C_4)$ alkylamino radical,
- $R_8$  denotes a hydrogen or halogen atom or a  $C_1-C_4$

20 alkoxy radical.

17. Composition according to Claim 16, characterized in that the sesamol derivatives are chosen from 2-bromo-4,5-methylenedioxyphenol,

2-methoxy-4,5-methylenedioxyaniline and 2-( $\beta$ -hydroxy-ethyl)amino-4,5-methylenedioxybenzene, and the addition salts thereof with an acid.

18. Composition according to Claim 11,  
5 characterized in that the pyrazoloazole derivatives are  
chosen from:

- 2-methylpyrazolo[1,5-b]-1,2,4-triazole,
  - 2-ethylpyrazolo[1,5-b]-1,2,4-triazole,
  - 2-isopropylpyrazolo[1,5-b]-1,2,4-triazole,
  - 10 - 2-phenylpyrazolo[1,5-b]-1,2,4-triazole,
  - 2,6-dimethylpyrazolo[1,5-b]-1,2,4-triazole,
  - 7-chloro-2,6-dimethylpyrazolo[1,5-b]-1,2,4-triazole,
  - 3,6-dimethylpyrazolo[3,2-c]-1,2,4-triazole,
  - 6-phenyl-3-methylthiopyrazolo[3,2-c]-1,2,4-triazole,
  - 15 - 6-aminopyrazolo[1,5-a]benzimidazole,
- and the addition salts thereof with an acid.

19. Composition according to Claim 11,  
characterized in that the pyrroloazole derivatives are  
chosen from:

- 20 - 5-cyano-4-ethoxycarbonyl-8-methylpyrrolo[1,2-b]-  
1,2,4-triazole,  
- 5-cyano-8-methyl-4-phenylpyrrolo[1,2-b]-  
1,2,4-triazole,  
- 7-amido-6-ethoxycarbonylpyrrolo[1,2-a]benzimidazole,  
25 and the addition salts thereof with an acid.

20. Composition according to Claim 11,  
characterized in that the imidazoloazole derivatives  
are chosen from:

- 7,8-dicyanoimidazolo[3,2-a]imidazole,
  - 7,8-dicyano-4-methylimidazolo[3,2-a]imidazole,
- and the addition salts thereof with an acid.

21. Composition according to Claim 11,  
 5 characterized in that the pyrazolopyrimidine  
 derivatives are chosen from:

- pyrazolo[1,5-a]pyrimidin-7-one,
- 2,5-dimethylpyrazolo[1,5-a]pyrimidin-7-one,
- 2-methyl-6-ethoxycarbonylpyrazolo[1,5-a]pyrimidin-  
 10 7-one,
- 2-methyl-5-methoxymethylpyrazolo[1,5-a]pyrimidin-  
 7-one,
- 2-tert-butyl-5-trifluoromethylpyrazolo[1,5-  
 a]pyrimidin-7-one,
- 15 - 2,7-dimethylpyrazolo[1,5-a]pyrimidin-5-one, and the  
 addition salts thereof with an acid.

22. Composition according to Claim 11,  
 characterized in that the pyrazoline-3,5-dione  
 derivatives are chosen from:

- 20 - 1,2-diphenylpyrazoline-3,5-dione,
  - 1,2-diethylpyrazoline-3,5-dione,
- and the addition salts thereof with an acid.

23. Composition according to any one of the  
 preceding claims, characterized in that the  
 25 heterocyclic oxidation dye(s) represent(s) from 0.0001%  
 to 12% by weight relative to the total weight of the  
 ready-to-use dye composition.

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5                    25. Composition according to any one of the  
preceding claims, characterized in that it contains at  
least one benzenic oxidation base chosen from para-  
phenylenediamines, bis(phenylalkylenediamines,  
orthophenylenediamines, para-aminophenols and ortho-  
0 aminophenols, and the addition salts thereof with an  
acid, and/or at least one benzenic coupler chosen from  
meta-phenylenediamines, meta-aminophenols and meta-  
diphenols and the addition salts thereof with an acid,  
and/or at least one direct dye.

20 27. Composition according to any one of the preceding claims, characterized in that the medium which is suitable for dyeing consists of water or of a mixture of water and at least one organic solvent.

29. Process for dyeing keratin fibres, and in particular human keratin fibres such as the hair,

characterized in that at least one ready-to-use dye composition as defined in any one of the preceding claims is applied to the said fibres, for a period which is sufficient to develop the desired coloration.

5           30. Process according to Claim 29, characterized in that it includes a preliminary step which consists in separately storing, on the one hand, a composition (A) comprising, in a medium which is suitable for dyeing, at least one heterocyclic  
10           oxidation dye as defined in any one of Claims 1, 7 to 24 and 26, and, on the other hand, a composition (B) comprising in a medium which is suitable for dyeing, at least one laccase-type enzyme, and then in mixing them  
15           together at the time of use, after which this mixture is applied to the keratin fibres.

          31. Multi-compartment dyeing device or "kit", characterized in that it includes a first compartment comprising composition (A) as defined in Claim 30 and a second compartment comprising  
20           composition (B) as defined in Claim 30.

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